

8-7: Powers and Roots of Negative Numbers

Warm-up: Complete the In-Class Activity on p. 510. Record your findings below.

$$(-x)^n$$

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***All properties that we have studied before will work when the base is negative!

Example 1: Simplify.

a. $(-3)^4 \cdot (-3)^{-6}$

b. $\frac{(-5)^6}{(-5)^3}$

*** \sqrt{x} is real, $\sqrt{-x}$ is imaginary, $x \geq 0$.

***When x and y are negative, $\sqrt{x} \cdot \sqrt{y} \neq \sqrt{xy}$

$$\sqrt{-4} \cdot \sqrt{-9} \neq \sqrt{36} = 6 \dots \text{Why?}$$

***When $x < 0$, $x^3 \neq \sqrt{x^6} \dots \text{Why?}$

***Noninteger powers of negative numbers are not defined at this level...you'll see them next year.
We *can* take the n^{th} roots of negative numbers.

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Example 2: Simplify $\sqrt[3]{-16384}$.

***the n^{th} root of a negative number, $\sqrt[n]{x}$ when n is even is not defined.

Theorem:

Example 3: Simplify $\sqrt[5]{-3645}$.

Homework:

**"WANTING TO BE SOMEONE YOU'RE NOT IS A WASTE OF THE PERSON
YOU ARE." - KURT COBAIN**